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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/628,591 | 07/28/2003 | William Taylor III | 9501-72542 | 4631 |

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BARNES & THORNBURG
11 SOUTH MERIDIAN
INDIANAPOLIS, IN 46204

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| EXAMINER |
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NGUYEN, TU MINH

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| ART UNIT | PAPER NUMBER |
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3748

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/628,591

Applicant(s)

TAYLOR ET AL.

Examiner

Tu M. Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-11 and 13-17 is/are rejected.
- 7) ☒ Claim(s) 3,12,18 and 19 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 103103,110303.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because on page 23, line 8, "236" should read --234--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 5, 10, 11, 16, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Bromberg et al. (U.S. Patent 6,560,958).

Re claims 1 and 16, as shown in Figure 4, Bromberg et al. disclose an emission abatement assembly and a method of operating said emission abatement assembly, the method comprising the steps of:

- determining if regeneration of a first DPNR (32) is to be performed and generating a first regenerate-DPNR signal in response thereto (the device (32) has a function to trap NO_x and particulate matter (see line 66 of column 4 to line 6 of column 5)), and

- operating a plasma fuel reformer (12) so as to produce and advance reformat gas to the first DPNR device in response to generation of the first regenerate-DPNR signal.

Re claim 2, the method of Bromberg et al. further comprises the steps of:

- determining if regeneration of a second DPNR device (42) is to be performed and generating a second regenerate-DPNR signal in response thereto, and

- operating the fuel reformer (12) so as to produce and advance reformat gas to the second DPNR device in response to generation of the second regenerate-DPNR signal.

Re claim 5, the method of Bromberg et al. further comprises the step of advancing exhaust gases from an internal combustion engine through the first DPNR device (32), wherein the determining step is performed contemporaneously with the exhaust gases advancing step.

Re claim 17, the assembly of Bromberg et al. further comprises a second DPNR device (42) fluidly coupled to the plasma fuel reformer (12), the first DPNR device and the second DPNR device being arranged in separate parallel flow paths.

Re claim 10, as shown in Figure 4, Bromberg et al. disclose an emission abatement assembly, comprising:

- a first DPNR device (32) having a gas inlet (the device (32) has a function to trap NO_x and particulate matter (see line 66 of column 4 to line 6 of column 5)),

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- a fuel reformer (12) having a gas outlet fluidly coupled to the gas inlet of the first DPNR device, and

- an electronic control unit (not shown but inherently must have) electrically coupled to the fuel reformer, the electronic control unit comprising (i) a processor, and (ii) a memory device electrically coupled to the processor, the memory device having stored therein a plurality of instructions which, when executed by the processor, causes the processor to:

(a) determine if regeneration of the first DPNR device (32) is to be performed and generate a first regenerate-DPNR signal in response thereto, and

(b) operate the reformer (12) so as to produce and advance reformat gas to the gas inlet of the first DPNR device in response to generation of the first regenerate-DPNR signal.

Re claim 11, the assembly of Bromberg et al. further comprises a second DPNR device having a gas inlet, wherein:

- the gas outlet of the fuel reformer is fluidly coupled to the gas inlet of the second DPNR device, and

- the plurality of instructions, when executed by the processor, further cause the processor to (a) determine if regeneration of the second DPNR device is to be performed and generate a second regenerate-DPNR signal in response thereto, and

(b) operate the fuel reformer so as to produce and advance reformat gas to the gas inlet of the second DPNR device in response to generation of the second regenerate-DPNR signal.

4. Claims 1, 5, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Hirota et al. (U.S. Patent 5,974,791).

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Re claim 1, as shown in Figures 1-3, Hirota et al. disclose a method of operating an emission abatement assembly, the method comprising the steps of:

- determining if regeneration of a first DPNR device (10a) is to be performed and generating a first regenerate-DPNR signal in response thereto (step 223 with YES answer), and
- operating a fuel reformer (10a) so as to produce and advance reformat gas to the first DPNR device in response to generation of the first regenerate-DPNR signal (as indicated on lines 42-62 of column 7, the injected diesel fuel is oxidized on the surface of the platinum in the DPNR device (10a) to produce a reductant comprising at least one of hydrogen and carbon monoxide).

Re claim 5, the method of Hirota et al. further comprises the step of advancing exhaust gases from an internal combustion engine through the first DPNR device (32), wherein the determining step is performed contemporaneously with the exhaust gases advancing step.

Re claim 9, in the method of Hirota et al., the step of determining if regeneration of the first DPNR device is to be performed comprises determining an amount of NO_x produced by an internal combustion engine since the first DPNR device was last regenerated (see step 411 in Figure 4).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bromberg et al. as applied to claims 2 and 1, respectively, above, in view of Hirota et al.

Re claim 4, as shown in Figure 4, the method of Bromberg et al. comprises the operation of a two-valve system to control the exhaust gas flow through the first DPNR device and the second DPNR device.

Bromberg et al., however, fail to disclose that instead of the two-valve system, a single diverter valve is utilized to control the exhaust gas flow through the first and the second DPNR devices.

As illustrated in Figure 1, Hirota et al. teach an exhaust gas purification device comprising a pair of DPNR devices (10a, 10b) in parallel and a single diverter valve (9) positioned in a first valve position so as to reduce a flow of exhaust gas through the first DPNR device in response to generation of the first regenerate-DPNR signal, and positioned in a second valve position so as to reduce the flow of exhaust gas through the second DPNR device in response to generation of the second regenerate-DPNR signal. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have replaced the two-valve component of Bromberg et al. with the single diverter valve taught by Hirota et al., since the use thereof would have reduced the complexity of the assembly in Bromberg et al.

Re claim 9, in the modified method of Bromberg et al., the step of determining if regeneration of the first DPNR device is to be performed comprises determining an amount of NO_x produced by an internal combustion engine since the first DPNR device was last regenerated (see step 411 in Figure 4 of Hirota et al.).

7. Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bromberg et al. as applied to claims 1 and 10, respectively, above, in view of Kato et al. (U.S. Patent 6,134,883).

The assembly and method of Bromberg et al. disclose the invention as cited above, however, fail to disclose that the assembly further comprises a NO_x sensor configured to sense the amount of NO_x in a flow of exhaust gas, wherein the plurality of instructions, when executed by the processor, further cause the processor to determine if regeneration of the first DPNR device is to be performed based on output from the NO_x sensor.

As illustrated in Figure 6 and indicated in claim 1, Kato et al. teach the use of a NO_x sensor (40) positioned downstream from a NO_x catalyst (30) to determine when to regenerate the NO_x catalyst. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the NO_x sensor by Kato et al. in the assembly and method of Bromberg et al., since the use thereof would have provided a means to accurately determine when the NO_x trap is saturated with NO_x in order to begin a regenerating step.

8. Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bromberg et al. as applied to claims 1 and 10, respectively, above, in view of Kumagai (U.S. Patent 6,090,187).

The assembly and method of Bromberg et al. disclose the invention as cited above, however, fail to disclose that the assembly further comprises a pressure sensor configured to sense a pressure drop across the first DPNR device, wherein the plurality of instructions, when

executed by the processor, further cause the processor to determine if regeneration of the first DPNR device is to be performed based on output from the pressure sensor.

As depicted in Figures 1 and 5B, Kumagai teaches that it is conventional in the art to sense a pressure difference across a filter (5a) by using upstream and downstream pressure sensors (18). If the pressure difference is greater than a threshold value (step S6 with YES answer), a regeneration of the filter is performed (step S7). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the pressure sensors taught by Kumagai in the assembly and method of Bromberg et al., since the use thereof would have provided a means to accurately determine when the filter is saturated with soot in order to begin a regenerating step.

9. Claims 8 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bromberg et al. as applied to claims 1 and 10, respectively, above, in view of Murachi et al. (U.S. Patent 5,746,989).

The assembly and method of Bromberg et al. disclose the invention as cited above, however, fail to disclose that the plurality of instructions, when executed by the processor, further cause the processor to generate the first regenerate-DPNR signal if a predetermined period of time has elapsed since the first DPNR device was last regenerated.

As shown in Figures 1, 3, and 5, Murachi et al. teach that it is conventional in the art to time an elapsed period since the NOx trap (9) or the particulate filter (7) was last regenerated in order to begin a regeneration cycle of each device. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by

Murachi et al. in the assembly and method of Bromberg et al., since the use thereof would have provided a means to accurately determine when the NOx trap or the filter is saturated in order to begin a regenerating step.

Allowable Subject Matter

10. Claims 3, 12, 18, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

These claims claim a diverter valve that is fluidly coupled to the first DPNR device, the second DPNR device, and the fuel reformer, which is not disclosed or rendered obvious by the prior art of record.

Prior Art

11. The IDS (PTO-1449) filed on October 31 and November 3, 2003 have been considered. An initialized copy of each is attached hereto.

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of seven patents: Boegner et al. (U.S. Patent 6,170,259), van Nieuwstadt et al. (U.S. Patent 6,679,051), Hirota et al. (U.S. Patent 6,708,486), Webb et al. (U.S. Patent 6,742,328), Stroia et al. (U.S. Patent 6,745,560), Laroo et al. (U.S. Patent 6,779,339), and Kupe et al. (U.S. Patent 6,832,473) further disclose a state of the art.

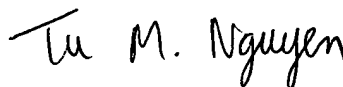
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Communication

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TMN

January 6, 2005

Tu M. Nguyen

Primary Examiner

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